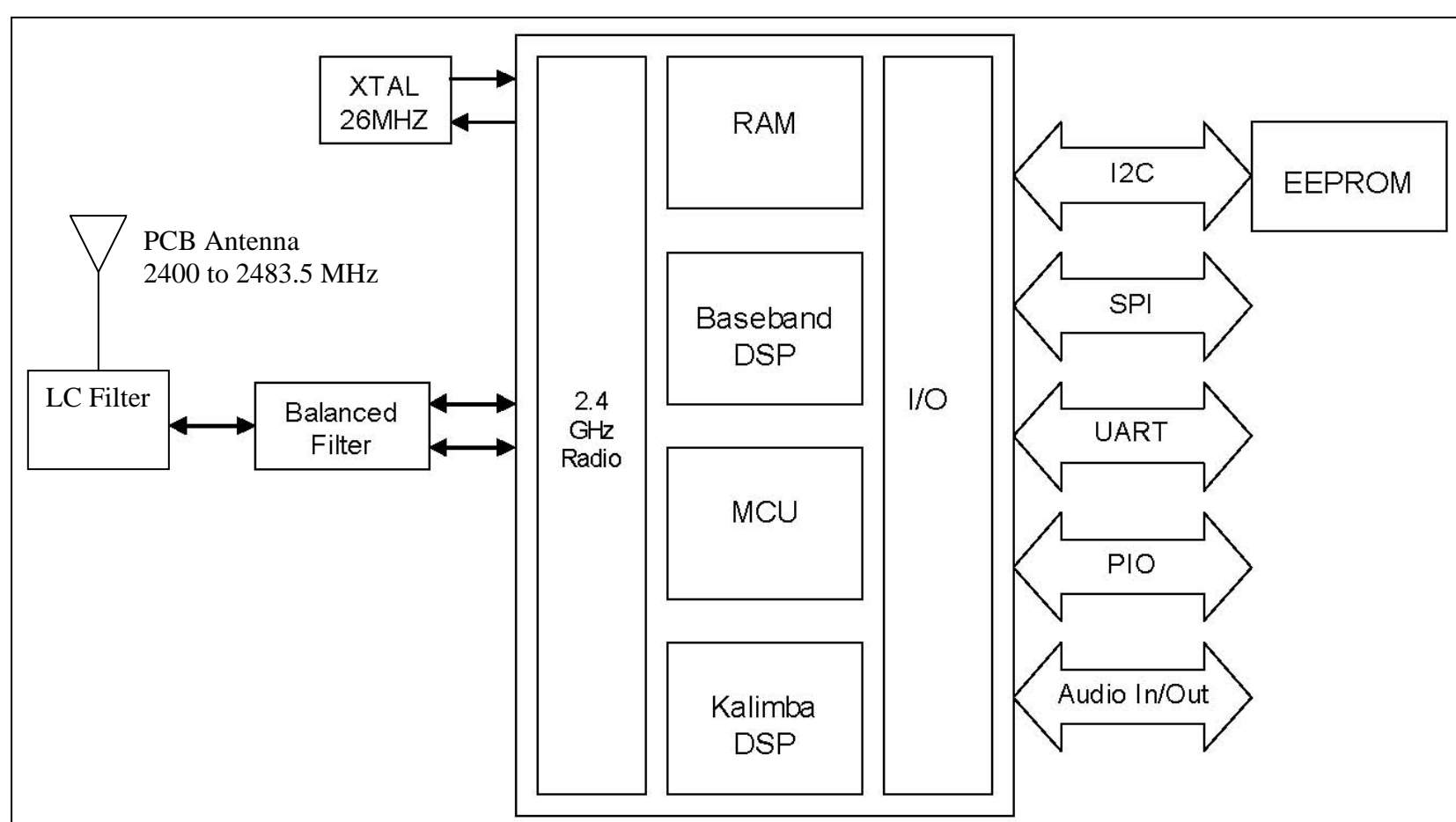# BC5MMRPA Class2 Bluetooth Module

Features

- Class2 module with printed PCB antenna
- Fully Qualified Bluetooth 2.1 + EDR
- CSR BC5MM-ROM chip
- Low current consumption
- 3.3V operation
- High quality 95db SNR on DAC playback
- LED drivers and faders
- Support of noise and echo cancellation
- Configurable 5-band EQ
- 802.11 Co-existence
- A2DP, AVRCP, HSP, HFP profile support
- RoHS compliant
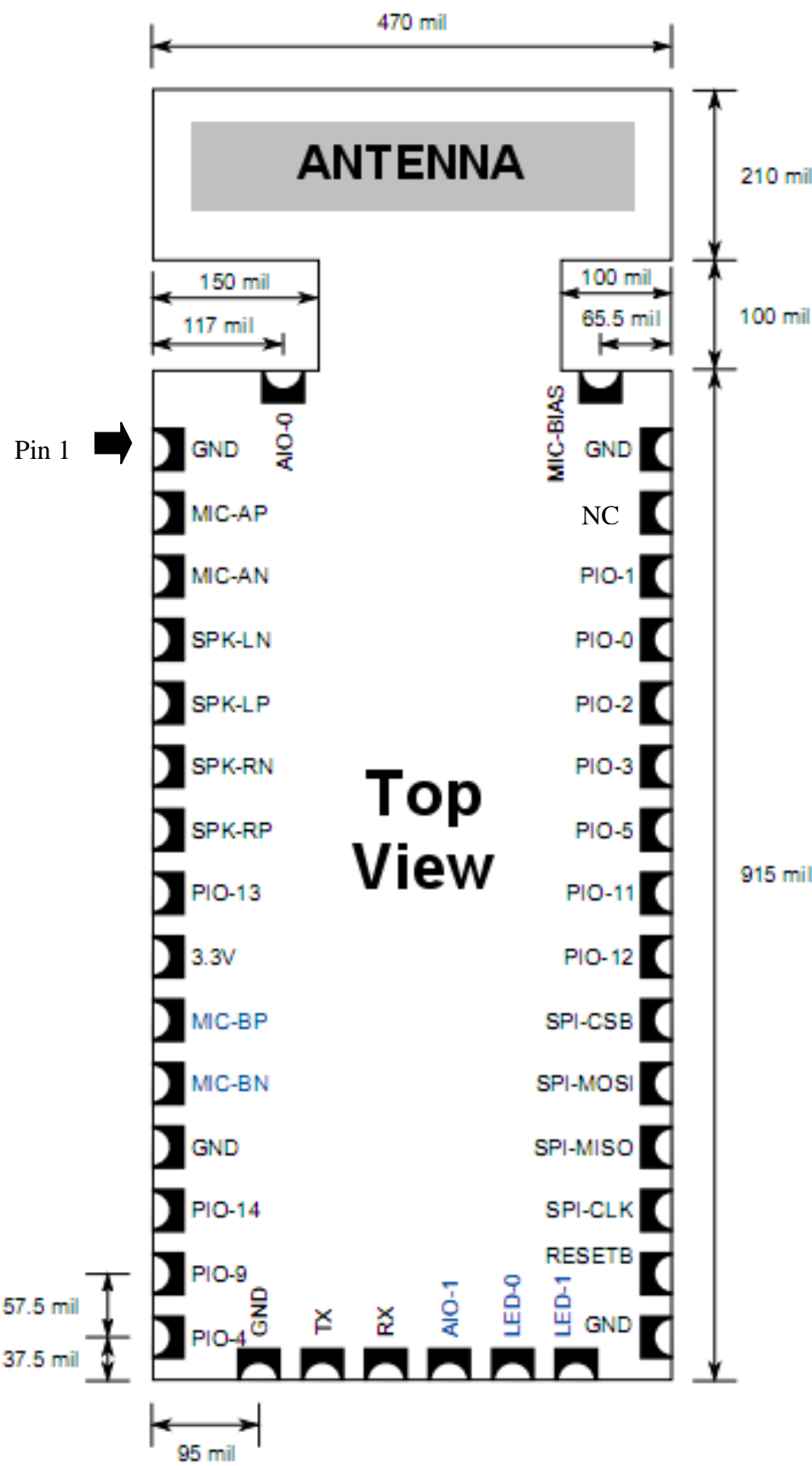- Dimension: 30.0 x 12.0 x 2.6 mm

Applications

- Wireless speakers
- Stereo headset
- Hands-free car kit
- VoIP handsets

Block Diagram

BC5MMRPA is a Class 2 Bluetooth sub-system using BlueCore5 –Multimedia ROM chipset from leading Bluetooth chipset supplier Cambrige Silicon Radio. .It interfaces to a 32-kbit EEPROM using I2C interface. The software stack running on the BlueCore5 ROM chipset is fully compliant to Bluetooth Specification v2.1 + EDR. BC5MMRPA also has necessary balun and bandpass filters to interface with a build-in PCB antenna, which forms a very cost effective radio subsystem.

Physical Layout

470 mil

ANTENNA

210 mil

150 mil
117 mil

100 mil
65.5 mil

100 mil

Pin 1

GND	GND
MIC-AP	NC
MIC-AN	PIO-1
SPK-LN	PIO-0
SPK-LP	PIO-2
SPK-RN	PIO-3
SPK-RP	PIO-5
PIO-13	PIO-11
3.3V	PIO-12
MIC-BP	SPI-CSB
MIC-BN	SPI-MOSI
GND	SPI-MISO
PIO-14	SPI-CLK
PIO-9	RESETB
PIO-4	GND

AIO-0

MIC-BIAS

Top
View

915 mil

57.5 mil
37.5 mil

GND   TX   RX   AIO-1   LED-0   LED-1

95 mil

Pins Configurations

PIN	NAME	TYPE	FUNCTION
1	GND	GND	Ground
2	MIC-AP	Analogue	Microphone A positive input
3	MIC-AN	Analogue	Microphone A negative input
4	SPK-LN	Analogue	Differential negative left speaker output
5	SPK-LP	Analogue	Differential positive left speaker output
6	SPK-RN	Analogue	Differential negative right speaker output
7	SPK-RP	Analogue	Differential positive right speaker output
8	PIO(13)	Bi-directional	Programmable Input/Output line
9	VDD	Power	3.3V Power Supply Input
10	MIC-BP	Analogue	Microphone B positive input
11	MIC-BN	Analogue	Microphone B negative input
12	GND	GND	Ground
13	PIO(14)	Bi-directional	Programmable Input/Output line
14	PIO(9)	Bi-directional	Programmable Input/Output line
15	PIO(4)	Bi-directional	Programmable Input/Output line
16	GND	GND	Ground
17	UART_TX	CMOS Input	UART Data Output
18	UART_RX	CMOS Input	UART Data Input
19	AIO(1)	Bi-directional	Programmable Input/Output Line or Analogue input
20	LED(0)	Open Drain	LED driver
21	LED(1)	Open Drain	LED driver
22	GND	GND	Ground
23	RESETB	CMOS input	Reset if low. Input debounced so must be low for >5ms to cause a reset
24	SPI_CLK	CMOS Input	Serial Peripheral Interface Clock
25	SPI_MISO	CMOS Output	Serial Peripheral Interface Data Output
26	SPI_MOSI	CMOS Input	Serial Peripheral Interface Data Input
27	SPI_CSB	CMOS Input	Chip Select For Synchronous Serial Interface active low
28	PIO(12)	Bi-directional	Programmable Input/Output line
29	PIO(11)	Bi-directional	Programmable Input/Output line
30	PIO(5)	Bi-directional	Programmable Input/Output line
31	PIO(3)	Bi-directional	Programmable Input/Output Line
32	PIO(2)	Bi-directional	Programmable Input/Output line
33	PIO(0)	Bi-directional	Programmable Input/Output line
34	PIO(1)	Bi-directional	Programmable Input/Output line
35	NC		No connect
36	GND	GND	Ground
37	MIC_BIAS	Analogue	Microphone bias
38	AIO(0)	Bi-directional	Programmable Input/Output Line or or Analogue input

General Electrical Specification

Absolute Maximum Ratings		
Ratings	Min.	Max.
Storage Temperature	-40 ℃	+85 ℃
Supply Voltage VDD	-0.4 V	3.7 V
Recommended Operating Condition		
Operating Condition	Min.	Max.
Operating Temperature range	0 ℃	+55 ℃
Supply Voltage VDD	3.0 V	3.6 V

Parameter	Description	Min.	Typ.	Max.	Units
Current Consumption - Discover	Already Paired	-	TBD	-	mA
	New Pairing	-	5	-	mA
Current Consumption - Playing	Dist = 1m	-	44	-	mA
	Dist = 10m	-	50	-	mA
Current Consumption - Pause	Dist = 1m	-	8	-	mA
	Dist = 10m	-	8	-	mA
Current Consumption - Sleep		-	2	-	mA

Radio Characteristics

Radio Characteristics, VDD = 3.3V Temperature =+20°C						
	Frequency (GHz)	Min	Typ	Max	Bluetooth Specification	Unit
Sensitivity at 0.1% BER	2.402	-	-83	-82	< - 70	dBm
	2.441	-	-83	-82		dBm
	2.480	-	-83	-82		dBm
Maximum received signal at 0.1% BER	2.402	-	-6	0	> - 20	dBm
	2.441	-	-6	0		dBm
	2.480	-	-6	0		dBm
RF transmit power [1]	2.402	-	+2	-	-6 to +4 [2]	dBm
	2.441	-	+2	-		dBm
	2.480	-	+2	-		dBm
Initial carrier frequency tolerance	2.402	-	12	20	±75	kHz
	2.441	-	10	20		kHz
	2.480	-	9	20		kHz
20dBm bandwidth for modulated carrier	2.402	-	879	1000	< 1000	kHz
	2.441	-	816	1000		kHz
	2.480	-	819	1000		kHz
Drift (single slot packet)	2.402	-	10	20	<25	kHz
	2.441	-	10	20		kHz
	2.480	-	10	20		kHz
Drift (five slot packet)	2.402	-	14	20	<40	kHz
	2.441	-	14	20		kHz
	2.480	-	14	20		kHz
Drift Rate	2.402	-	11	15	20	kHz/50µs
	2.441	-	-	15		kHz/50µs
	2.480	-	-	15		kHz/50µs
RF power control range		16	35	-		
RF power range control resolution		-	1.8	-	-	dB

	2.402	145	165	175	140<△f1avg <175	kHz
△f1avg "Maximum Moudulation"	2.441	145	165	175		kHz
	2.480	145	165	175		kHz
	2.402	115	150	-		kHz
△f2maz "Minimum Modulation"	2.441	115	150	-	115	kHz
	2.480	115	150	-		kHz
C/I co-channel		-	10	11	<= 11	dB
Adjacent channel selectivity C/I F=F0 +1 MHz [3][5]		-	-4	0	<= 0	dB
Adjacent channel selectivity C/I F=F0 - 1MHz [3][5]		-	-4	0	<= 0	dB
Adjacent channel selectivity C/I F=F0 +2 MHz [3][5]		-	-35	-30	<= - 30	dB
Adjacent channel selectivity C/I F=F0 - 2MHz [3][5]		-	-21	-20	<= - 20	dB
Adjacent channel selectivity C/I F>=F0 +3 MHz [3][5]		-	-45	-	<= - 40	dB
Adjacent channel selectivity C/I F<=F0 -5 MHz [3][5]		-	-45	-	<= - 40	dB
Adjacent channel selectivity C/I F=Fimage [3][5]		-	-18	-9	<= - 9	dB
Adjacent channel transmit power F=F0±2MHz [4][5]		-	-35	-20	<= - 20	dBc
Adjacent channel transmit power F=F0±3MHz [4][5]		-	-45	-40	<= - 40	dBc

Notes:
[1] PSR configuration setting maintains the transmit power to be within the Bluetooth specification v2.0 limits
[2] Class 2 RF transmit power range, Bluetooth specification v2.0
[3] Up to five exceptions are allowed in v2.0 of the Bluetooth specification
[4] Up to three exceptions are allowed in v2.0 of the Bluetooth specification
[5] Measured at F0 = 2441MHz

FCC Statement:

NOTICE:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and   (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications made to this equipment not expressly approved by GT-tronics HK Ltd may void the FCC authorization to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

Radiofrequency radiation exposure Information:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. Please see the RF Exposure information. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device should be installed and operated with a minimum distance of 20 cm between the antenna and all persons.

Label requirements:

Contains Transmitter Module FCC ID: B4OBC5MMRPA